



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005
& ANSI/NCSL Z540-1-1994

TRI-STATE INSTRUMENT SERVICE, INC.
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CALIBRATION

Valid To: September 30, 2024

Certificate Number: 1622.01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following dimensional calibrations^{1, 6}:

I. Dimensional

Parameter/Equipment	Range	CMC ^{2, 4} (±)	Comments
Bench Micrometers ³	Up to 2 in	20 μin	Gage blocks
Bore Gages – Internal Diameter (Hole Test – 3 Point)	Up to 0.1 in travel (0.0625 to 8) in	40 μin (65 + 1.5D) μin	Micrometer heads & custom fixture Ring gages
Dial Indicator – Calibrator & Micrometer Heads	Up to 1 in Up to 2 in	5.4 μin (10 + 1.0L) μin	Heidenhain CT-2501 Heidenhain CT-6001
Calipers ³	(0.01 to 12) in (12 to 48) in	330 μin (330 + 6.0L) μin	Gage blocks Mic standards
Chamfer Check ³	(0.02 to 2) in	500 μin	Special ring gages

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Height Gages – High Resolution LH-600 Type	Up to 24 in (24 to 40) in 24 in w/ ≤ 0.001 in resolution Up to 39 in < 0.0001 in resolution	(130 + 2.5L) μin (170 + 2.5L) μin (25 + 2.0L) μin (14 + 2.0L) μin	Webber bar & high- resolution height gage
Height Masters, Digi-Checks, Hite-Indicator	Up to 24 in	(14 + 2.0L) μin	Webber bar & high- resolution height gage
Indicators ³ – Dial & Digital Test	< 0.01 in (0.01 to 1) in (1 to 2) in (2 to 4) in (0.001, 0.0005, 0.0001) in (0.01, 0.005, 0.001) mm	5 μin 15 μin 24 μin (40 + 17L) μin 20 μin 0.0005 mm	Heidenhain Micrometer heads & custom fixture
Micrometers – Outside – Spindle Only ³ Depth ³ Inside Thread V-Anvil	(Up to 12) in (12 to 40) in Up to 12 in (0.25 to 24) in Up to 2 in (0.09 to 4) in	(33 + 2.0L) μin (75 + 2.0L) μin (150 + 8.0L) μin (150 + 1.5L) μin 75 μin 100 μin	Gage blocks & micrometer standards Gage blocks CMM or LH-600 Thread plugs CMM & pin gages
Calibration Masters – Mikemaster Outside Diameter Kalmaster Depth Master	Up to 3 in (0.5 to 12) in Up to 12 in Up to 12 in	15 μin (20 + 3.2D) μin (25 + 1.5L) μin (25 + 1.5L) μin	THV ULM LH-600 & Webber bar LH-600 & Webber bar

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Levels	Up to 15 in length	100 μin/ft	Special level checker
Electronic Levels	Up to 100 arc sec.	1.3 arc sec.	
Standards –			
Micrometer	Up to 24 in (> 24 to 40) in	(15 + 5L) μin (110 + 1.5L) μin	ULM LH-600 & Webber bar
Thread Micrometer	Up to 4 in	(50 + 2L) μin	ULM
Squares	Up to 30 in	(120 + 15L) μin	CMM
Sine Bars (Up to 10 in) –			
Angle	Up to 45 °	0.000 85 °	CMM
Parallelism		25 μin	
Flatness		25 μin	
Surface Finish	Up to 400 Ra μin patch	2.3 μin Ra	Reference master
Surface Finish Testers –			
Ra Parameter	Up to 400 Ra	2.5 μin Ra	Reference master
Linearity	Up to 400 Ra	2.5 μin Ra	
Repeatability	Actual	0.6 resolution	
Optical Comparators ³ –			
Magnification	Up to 100 X	0.01 % magnification	Glass scales, length standards, angle blocks, squares
Linear Travel	Up to 12 in (12 to 20) in	240 μin 320 μin	
Squareness	X to Y Axis	100 μin	

Parameter/Equipment	Range	CMC ^{2,4} (\pm)	Comments
Major Diameter – Pin Gages Reversible Wires Plain Plugs XX – Tolerance Plug	(0.011 to 1) in Up to 1 in Up to 2 in (2 to 12) in Up to 2 in	10 μ in 7 μ in (7 + 1D) μ in (7 + 1.5D) μ in 5 μ in	THV THV THV ULM THV
Inside Diameter – Ring Gages	(0.04 to 4) in (4 to 12) in	(7 + 0.5D) μ in (7 + 1.5D) μ in	Diamet, P&W internal ULM
Rules – Steel Glass	Up to 48 in (> 48 to 120) in Up to 24 in	(120 + 4L) μ in (200 + 6L) μ in (20 + 2L) μ in	CMM & video system
Thread Gages – Standard Work & Set Plugs – Pitch Diameter Adjustable Ring Gages Adjustable & Solid Ring Gage – Pitch Diameter	Up to 6 in (0.04 to 6) in (0.5 to 6) in	(45 + 2D) μ in 150 μ in 91 μ in	Custom bench micrometer, thread wires Set plugs 2 Point P.D. ULM
Surface Plates ³ – Flatness Grade AA, A, & B Repeatability	(10 to 108) in Diagonal Up to 0.002 in	(29 + 1D) μ in 20 μ in	Electronic level system Repeat-o-meter
Spheres & Precision Balls	Up to 2 in	(5 + 1D) μ in	THV

Parameter/Equipment	Range	CMC ^{2,4} (±)	Comments
Optical Parallels – Parallelism Length – Thickness Flatness – Parallels Optical Flats	Up to 1 in Thick Up to 4 in Diameter Up to 4 in Diameter	5 μin 5 μin 5 μin	Heidenhain Three optical flat method Comparison to master
Length – Between Two Planes (Step Length)	(0.01 to 1.5) in	32 μin	Heidenhain
Plain Tapered Plugs – External Diameter 0.75 TPF All Tapers	(0.01 to 4) in (0.01 to 8) in	49 μin 25 μin	Custom bench micrometer & rolls Standard measuring machine, gage block & rolls
Plain Tapered Rings – Internal Diameter 0.75 TPF All Tapers	(0.04 to 4) in (0.04 to 8) in	71 μin 81 μin	CMM
External Tapered Thread Plug Pitch Diameter Major Diameter	(0.047 to 4) in (0.1 to 4) in	72 μin 44 μin	Custom bench micrometer Custom bench micrometer
Internal Tapered Thread Plug Pitch Diameter	(0.06 to 4) in	91 μin	Tapered master plug & Heidenhain (stand-off method)

Parameter/Equipment	Range	CMC ^{2,4} (\pm)	Comments
Thread Wires			
Inch	(4 to 120) TPI	6.5 μ in	Master wire & THV
Metric	(0.2 to 10) Pitch	6.5 μ in	
Gage Block	Up to 4 in	(3.8 + 0.5L) μ in	CT-6001 Heidenhain w/ master gage blocks single point measurement
Geometry ⁵			Various measuring devices including but not limited to: Video, CMM, height gage, gage blocks, ULM, THV, optical comparators, masters, etc.
Length			
1D	Up to 28 in	(30 + 4L) μ in	
2D	20 in x 38 in	(40 + 4L) μ in	
3D	20 in x 28 in x 16 in	(40 + 4L) μ in	
Angles	Up to 360 °	15 sec	
Diameter/Radius	Up to 12 in	(40 + 4L) μ in	
Straightness	Up to 50 in	50 μ in per 12 in	
Radius Gages	Up to 2 in	150 μ in	Optical/video comparator

¹ This laboratory offers commercial and field calibration services.

² Calibration and Measurement Capability Uncertainty (CMC) is the smallest uncertainty of measurement that a laboratory can achieve within its scope of accreditation when performing more or less routine calibrations of nearly ideal measurement standards or nearly ideal measuring equipment. CMCs represent expanded uncertainties expressed at approximately the 95 % level of confidence, usually using a coverage factor of $k = 2$. The actual measurement uncertainty of a specific calibration performed by the laboratory may be greater than the CMC due to the behavior of the customer's device and to influences from the circumstances of the specific calibration.

³ Field calibration service is available for this calibration. Please note the actual measurement uncertainties achievable on a customer's site can normally be expected to be larger than the CMC found on the A2LA Scope. Allowance must be made for aspects such as the environment at the place of calibration and for other possible adverse effects such as those caused by transportation of the calibration equipment. The usual allowance for the actual uncertainty introduced by the item being calibrated, (e.g. resolution) must also be considered and this, on its own, could result in the actual measurement uncertainty achievable on a customer's site being larger than the CMC.

⁴ In the statement of CMC, L is the nominal length in inches; D is the nominal diameter in inches.

⁵ For Geometry measurements the best CMC may vary depending upon the type of measuring equipment utilized.

⁶ This scope meets A2LA's *P112 Flexible Scope Policy*.



Accredited Laboratory

A2LA has accredited

TRI-STATE INSTRUMENT SERVICE, INC.

Ft. Wayne, IN

for technical competence in the field of

Calibration

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This laboratory also meets the requirements of ANSI/NCSL Z540-1-1994 and – Specific Requirements: Calibration Laboratory Accreditation Program. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 25th of August 2022.

A blue ink signature of Mr. Trace McInturff, Vice President of Accreditation Services.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 1622.01
Valid to September 30, 2024
Revised June 26, 2024



For the calibrations to which this accreditation applies, please refer to the laboratory's Calibration Scope of Accreditation.